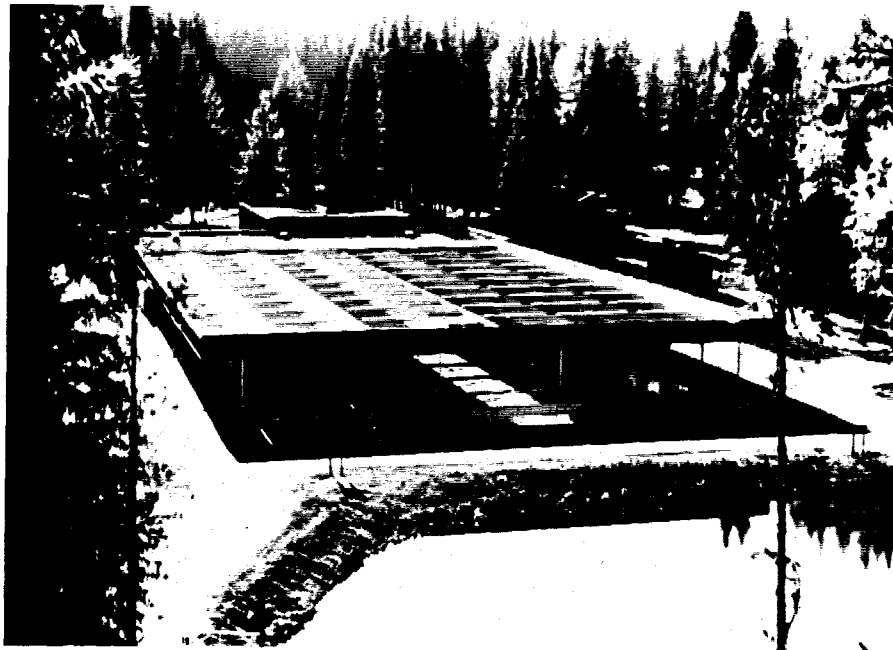




**MCCALL SUMMER CHINOOK  
SALMON HATCHERY  
1988 Brood Year Production Report**



**Prepared for U.S. Fish and Wildlife Service  
Contract #14-16-0001-91504  
By**

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## **ABSTRACT**

McCall Summer Chinook Salmon Hatchery was the first hatchery built to enhance the chinook salmon runs into Idaho under the Water Resources Development Act of 1976. The hatchery was built in 1979 with a production goal of 1,000,000 smolts for stocking into the South Fork of the Salmon River and a mitigation goal of returning 8,000 adult summer chinook above Lower Granite Dam.

The adult summer chinook trapping and spawning operation began on June 20, 1988 and concluded on September 9, 1988. A total of 2,393 summer chinook salmon were trapped, measured, and recorded during this time period. Of the total 2,393 fish trapped, 1,050 were males, 1,293 were females, and 50 were jacks.

There were 555 females spawned producing 2,834,364 green eggs. Pahsimeroi Hatchery received 309,000 eyed eggs, 501,900 fry were planted into the East Fork of the South Fork and Johnson Creek tributaries, 290,000 pre-smolts were released into Johnson Creek, and 1,032,500 smolts were released into the South Fork of the Salmon River at Knox Bridge.

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## INTRODUCTION

Hydroelectric dams on the Columbia and Snake rivers have reduced Idaho's salmon runs to critically low levels. In 1976, Congress enacted the water Resources Development Act, a portion of which **is** the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). The LSRCP compensates Idaho for losses of fish and wildlife caused by the Lower Snake River projects (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams). The McCall Summer Chinook Hatchery was the first hatchery built as partial fulfillment of the LSRCP.

## LOCATION

McCall Hatchery was constructed in 1979 by the U.S. Army Corps of Engineers. Operational funds are provided by the U.S. Fish and Wildlife Service (USFWS), and the facility is staffed and operated by the Idaho Department of Fish and Game (IDFG). The hatchery is located within the city limits of McCall, Idaho on the North Fork of the Payette River, approximately 0.16 km (1/4 miles) downstream from Payette Lake.

## OBJECTIVES

The objectives of the McCall Summer Chinook Salmon Hatchery are:

1. Restore summer chinook salmon Oncorhynchus tshawytscha to the South Fork of the Salmon River; historically a major summer chinook stream in Idaho.
2. Trap and spawn adult salmon returning to the South Fork of the Salmon River.
3. Raise 1,000,000 summer chinook smolts for release in the South Fork of the Salmon River and return 8,000 adult summer chinook above Lower Granite Dam.
4. Evaluate fish rearing capabilities of the McCall Hatchery.
5. Work with management and research to identify optimum operating procedures for the McCall Hatchery.

## FISH REARING FACILITIES

Fish rearing facilities include:

1. Twenty-four 8-tray stacks of Heath type incubators, 20 stacks of 8-tray F.A.L. incubators.

2. Fourteen concrete vats 4 ft x 40 ft x 2 ft (water depth).
3. Two concrete rearing ponds 196 ft x 40.5 ft x 3 ft (water depth).
4. One concrete collection basin 101 ft x 15 ft.

Designed capacity of the hatchery is 1,000,000 smolts averaging 17 fish per pound.

An adult trapping and spawning facility is located on the South Fork of the Salmon river near Cabin Creek, approximately 26 miles east of Cascade, Idaho. This facility is equipped with a removable weir, fish ladder, trap, two adult holding ponds 10 ft x 90 ft, and a covered spawning area. Water is supplied from the South Fork of the Salmon River through a 33-inch underground pipeline. Holding capacity for the facility is approximately 1,000 adults. Adults trapped in the excess of the egg requirements are passed above the weir for natural spawning. Eggs collected at the facility are transported "green" to McCall for incubation, hatching, and rearing. Resulting smolts are transported back to the South Fork of the Salmon River for release.

#### **WATER SUPPLY**

Hatchery water is obtained from Payette Lake through a 36-inch underground pipeline. Water may be taken from the surface or from a depth of 50 feet, thus providing the capability of obtaining the best water temperature available.

Through an agreement with the Payette Lake Reservoir Company, 20 cubic feet per second of water flow is available for hatchery use. Design criteria and Production goals were established using this constraint, ensuring that the hatchery has enough water to meet its production goals.

Water quality analysis reveals a somewhat "distilled" system for rearing fish. Total hardness ranges from 6.3 to 7.06 mg CaCO<sub>3</sub>/l, while pH stays about 6.8. There are no problems with heavy metals.

#### **STAFFING**

The hatchery is staffed with three permanent employees: a Hatchery Superintendent III, a Hatchery Superintendent I, and a Fish Culturist. In addition, there are four temporary employees to assist during the busy field season. Also, there are two YCC employees hired for the summer.

## **FISH PRODUCTION**

The weir and trap on the South Fork of the Salmon River were put into operation on June 20, 1988, and trapping continued, through September 9, 1988. During this period, 2,393 adult salmon were trapped (Appendix 3).

Fork lengths were taken on all fish trapped (Appendices 3a and 4) with the exception of the fish that were hauled to Stolle Meadows.

Spawn-taking began on August 8, 1988 and concluded on September 9, 1988. During this period, 253 adult males and 17 jacks were used to fertilize 2,834,364 eggs from 555 females. The mean fecundity was 4,995 eggs per female. A total of 850 fish, including 451 females, 385 males, and 14 jacks, were released upstream of the weir to spawn naturally. Of this total, 43 females, 38 males, and 2 jacks were hauled to Stolle Meadows and released.

This year, carcasses were not given to the public due to the use of a fungicide to control fungus growth on the chinook caused by high water temperatures and extremely low flows.

## **EARLY REARING**

All of the eggs were water-hardened immediately after fertilization in a 100 ppm titratable iodine solution for one hour. This solution was buffered with 0.5% sodium bicarbonate. The eggs were then rinsed in well water and transported to the hatchery.

Approximately 80 fluid ounces of eggs were placed in the incubator trays supplied with a 6 gallon per minute flow. The number of green eggs was estimated using the displacement method. The eggs eyed after accumulating approximately 550 temperature units (DTU), at which time dead eggs were removed using an electronic egg picker equipped with an egg counter. From the 2,834,364 eggs taken, 2,301,843 eyed eggs were counted (81.2% average) and returned to the 8-tray incubator stacks. There were 309,000 eyed eggs shipped to the Pahsimeroi Hatchery. The remaining eggs hatched at approximately 900 DTU's, and the swim-up fry were transferred to the vats after accumulating 1,700 DTU's. Of the remaining 1,992,843 eyed eggs, 1,968,047 swim-up fry (98% survival) were transferred to early rearing vats.

The fish were held in the indoor rearing units until they averaged 250 fish per pound. They were then transferred to the outdoor rearing ponds.

## FISH DISTRIBUTION

### Fish Tagging

During the period of September 11 through September 24, 1989, the fish in rearing pond #2 were coded wire tagged (CWT), adipose clipped, and freeze branded (Tables 1 and 2).

Table 1. Summary of tags and marks used.

Dates Tagged	Pond Number	Number Tagged	Tag Code or Mark	Remarks
9-11/ 9-24-90	2	256,558	10-30-34	US-Can
	2	20,495	LDT1	FPC
	2	22,090	LDT3	FPC
	2	21,131	LDT4	FPC
10-1/ 10-16-90	1	542,988	TM-100	Feed Treatment
TOTAL		863,262		

Table 2. Release numbers by mark group.

Pond Number	Fish Per Pound	Mark	% Retention or Readable	Effective Release*
1	20.5	TM-100	100	523,250
2	21.0	None	N/A	195,975
2	21.0	CWT only	98	251,100
2	21.0	CWT & LDT1	98.65	20,200
2	21.0	CWT & LDT3	94.67	20,875
2	21.0	CWT & LDT4	100	21,100
TOTAL				1,032,500

\* Effective release number = (Initial Number Marked-Mortality)  
x % Retention or Readable and rounded to nearest 25.



### Fish Release Information

Disposition of brood year 1988 summer chinook were as follows. On October 12, 1988, 309,000 eyed eggs were shipped to the Pahsimeroi Hatchery. These eggs came from two separate lots of eggs and will be used to help reestablish a summer chinook run into the Pahsimeroi River. On May 8, 1989, 105,000 chinook fry weighing 255 pounds were released into the lower 3.5 miles of Sand Creek using a helicopter and a modified fire bucket. Also on May 8, 95,500 chinook fry weighing 233 pounds were released into Johnson Creek using the same method. On May 30, 1989, 201,100 chinook fry weighing 551 pounds were trucked to the East Fork of the South Fork of the Salmon River and stocked from Yellowpine to Sugar Creek. The final spring fry plant to be made was 100,300 fry weighing 316 pounds, which were scattered from Twin Bridge to Yellowpine on Johnson Creek. On August 9 and 10, 1989, a total of 290,000 fingerling chinook were planted into Johnson Creek from Tyndall Meadows to the Ice Hole Campground.

The smolt hauling operation began on March 16, 1990 and concluded on March 23, 1990. A total of 1,032,500 summer chinook smolts weighing 49,774 pounds were trucked to Knox Bridge on the South Fork of the Salmon River and released. These fish averaged 5.0 inches fork length and 20.7 fish per pound.

### Fish Health

The pre-release health assessment was conducted in February by IDFG pathologist (Table 3). This group of fish proved to be quite healthy at time of release as the last three disease inspections showed no presence of Bacterial Kidney Disease (BKD). BKD was detected at low levels early in the rearing cycle resulting in a positive listing for BKD, but at low incidence and intensity. These fish were given two feed treatments of Gallimycin at 4.5 gms of active erythromycin phosphate per 100 lbs of fish during the rearing cycle. During the 18-month rearing cycle from egg to smolt release, there were no major disease problems detected.

During the spawning season, 176 adult pond mortalities were sampled for BKD. Of these, 14 tested positive (8%), and 9 of the 14 were listed as heavy incidence. During the spawning season, 60 spawners were tested for BKD. Thirteen tested positive (21.7%); two of which were heavily infected. No other pathogens were found.

Table 3. Results of viral and bacteriological testing for the pre-release smolt assessment.

Pathogen	Sample Size	Results
IPN	60 fish	Negative
IHN	60 fish	Negative
EIBS	60 fish	Negative
BKD	60 fish	Negative*

\*Listed as positive due to detection in prior samples

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## SPECIAL STUDIES

During the brood year 1987 rearing cycle, mortality was considerably higher in the group of fish that were marked with coded wire tags, freeze brands, and adipose clips as compared to the unmarked group. It was decided to evaluate handling versus non-handling, i.e. marked fish versus non-marked fish, comparing overall mortality, BKD incidence, and adult returns.

Rearing densities of brood year 1988 fry were maintained as evenly as possible in both rearing ponds during the study. Pond #1 was to be the non-handled or unmarked group and pond #2 was the marked or handled group. Pond 1 was given a treatment of Terramycin (TM-100) mixed in the feed for 15 days to give them a florescent mark on the vertebrae, thus distinguishing them from the unmarked fish. Pond #2 fish received CWT with adipose clips and freeze brands with adipose clips and CWTs (Table 1).

No difference in mortality rates was seen between the groups, and both ponds tested negative for BKD. Final results will be available after all adult return information is collected.

Table 4. Survival from green egg to release.

Green Eggs	Eyed Eggs	%	Swim-up	%	Release	%
2,834,364	2,301,843	81	1,968,047	98	2,133,383*	75

\*Includes eyed eggs shipped, fry, pre-smolts, and smolts released.

## PRODUCTION COSTS

The cost of producing summer chinook eggs, fry, and smolts was \$.82 per pound of fish produced and is summarized in Table 5. An overall feed conversion of 1.38 pounds of feed per pound of fish produced was achieved.

Table 5. Production costs.

<u>Lbs Fish Produced</u>	<u>Lbs Feed Utilized</u>	<u>Feed Cost</u>	<u>Conversion</u>	<u>Cost per lb Produced</u>
56,161	77,316	\$46,244	1.38	.82

Operating Budget: \$293,500 Cost estimate for 18 month rearing excluding capitol outlay.

## **MISCELLANEOUS**

Major landscaping projects were completed this summer. The final sections of yard were leveled, stumps removed, and top soil brought in. These sections were seeded to grass and an underground sprinkler system installed.

A light fader system was purchased to mimic a natural light regime which replaced an outdated existing light system.

The enhancement project with the best results was the installation of aluminum baffles in all 14 of the indoor rearing vats. The fish appeared healthier, were produced at a better feed conversion compared to previous brood years, as the feed stays in suspension longer making it more available, and the fish were able to choose their comfort zone in the water column. Using baffles has also reduced cleaning time by two-thirds, thus improving efficiency.

## **A P P E N D I C E S**

Appendix 1. McCall Hatchery summer chinook salmon rack returns.

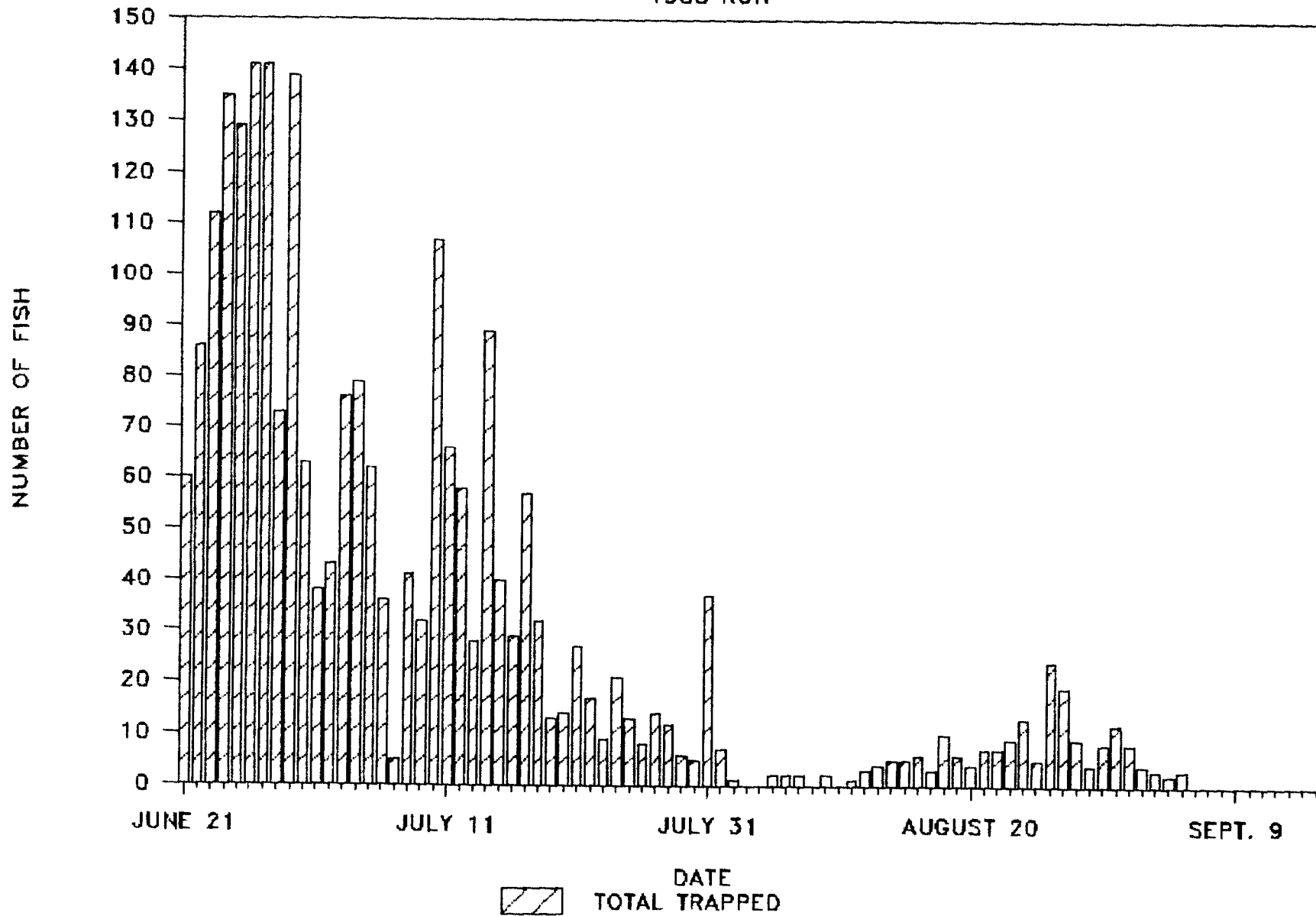
Run Date	Jacks	Adults	Total
1980	186	194	380
1981	124	400	524
1982	48	402	550
1983	504	433	937
1984	595	934	1,529
1985	828	1,410	2,238
1986	122	1,468	2,690
1987	386	2,319	2,705
1988	50	2,343	2,393

Appendix 2. Coded wire tag recoveries during 1988 return.  
(Known age groups by CWT data.)

Size Range	Age Group	# Males	# Females
<590 mm	3-yr-old	2	
590-970 mm	4-yr-old	99	
660-890 mm	4-yr-old	-	105
820-1050 mm	5-yr-old	36	
770-1020 mm	5-yr-old	-	15
Total CWT Fish		257	

# SFSR RUN TIMING

1988 RUN



Appendix 3. South Fork Salmon run timing.

Appendix 3A. South Fork Salmon River run timing, brood year 1988.

Date	Total run	Males	Females	Jacks
Jun 21	60	22	38	0
Jun 22	86	37	48	1
Jun 23	112	56	54	2
Jun 24	135	55	80	0
Jun 25	129	63	63	3
Jun 26	141	59	82	0
Jun 27	141	59	82	0
Jun 28	73	34	38	1
Jun 29	139	61	77	1
Jun 30	63	37	26	0
Jul 1	38	21	17	0
Jul 2	43	23	20	0
Jul 3	76	53	21	2
Jul 4	79	46	33	0
Jul 5	62	32	30	0
Jul 6	36	15	21	0
Jul 7	5	2	3	0
Jul 8	41	10	30	1
Jul 9	32	13	19	0
Jul 10	107	42	65	0
Jul 11	66	28	35	3
Jul 12	58	23	33	2
Jul 13	28	16	11	1
Jul 14	89	33	54	2
Jul 15	40	16	23	1
Jul 16	29	9	18	2
Jul 17	57	16	37	4
Jul 18	32	7	25	0
Jul 19	13	7	4	2
Jul 20	14	7	6	1
Jul 21	27	11	13	3
Jul 22	17	8	9	0
Jul 23	9	4	3	2
Jul 24	21	11	8	2
Jul 25	13	6	6	1
Jul 26	8	2	5	1
Jul 27	14	4	9	1
Jul 28	12	5	5	2
Jul 29	6	2	3	1
Jul 30	5	3	1	1
Jul 31	37	15	21	1
Aug 1	7	3	3	1
Aug 2	1	0	1	0
Aug 3	0	0	0	0

88TABLES

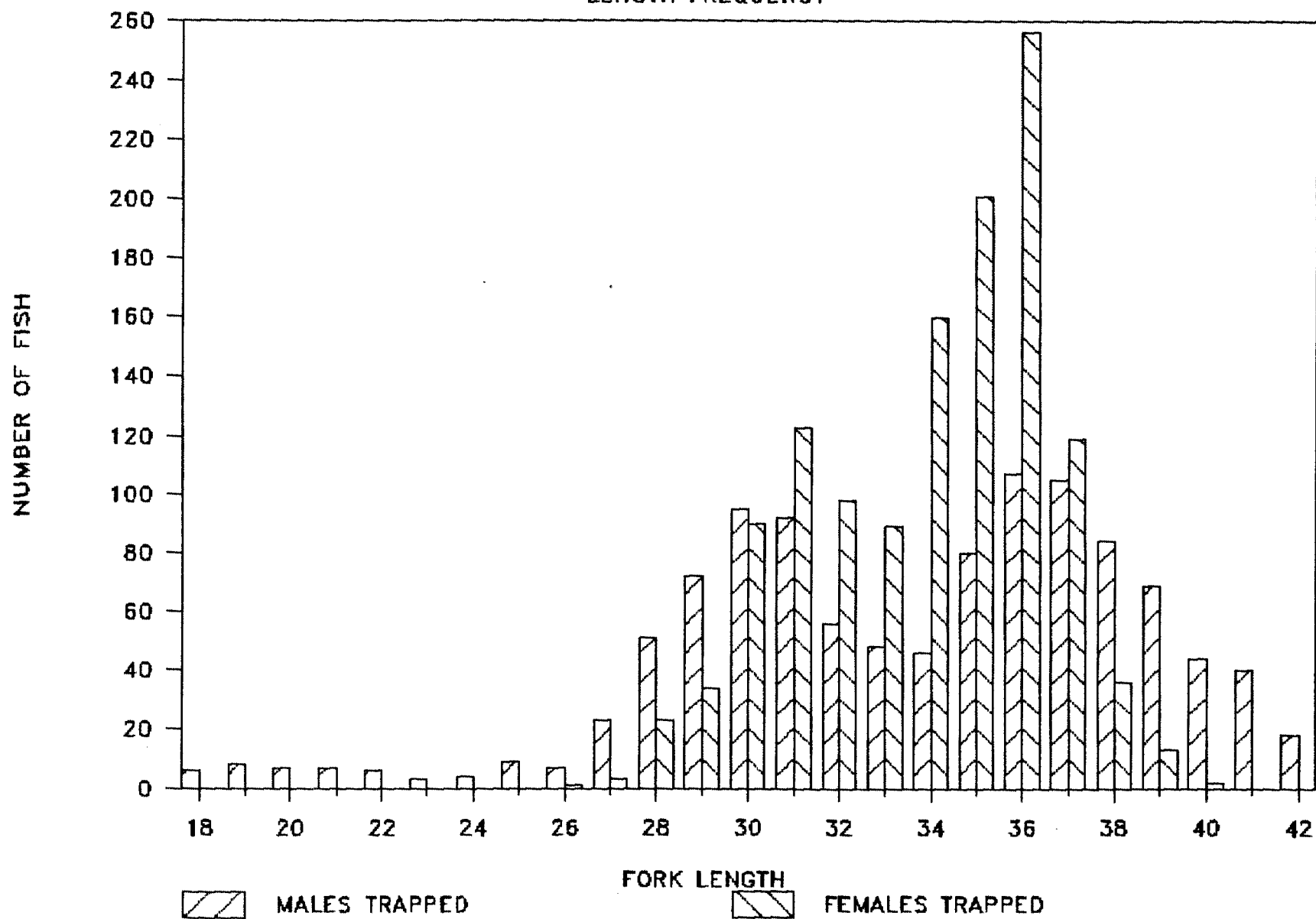


Appendix 3A. Continued.

Date	Total run	Males	Females	Jacks
Aug 4	0	0	0	0
Aug 5	2	2	0	0
Aug 6	2	2	0	0
Aug 7	2	1	1	0
Aug 8	0	0	0	0
Aug 9	2	2	0	
Aug 10	0	0	0	
Aug 11	1	1	0	
Aug 12	3	0	3	0
Aug 13	4	2	2	0
Aug 14	5	4	1	0
Aug 15	5	2	3	0
Aug 16	6	2	4	0
Aug 17	3	1	2	0
Aug 18	10	3	7	0
Aug 19	6	2	3	1
Aug 20	4	2	2	0
Aug 21	7	5	2	0
Aug 22	7	3	3	1
Aug 23	9	4	5	0
Aug 24	13	5	8	0
Aug 25	5	2	3	0
Aug 26	24	4	20	0
Aug 27	19	6	13	0
Aug 28	9	0	8	1
Aug 29	4	0	4	0
Aug 30	8	2	6	0
Aug 31	12	4	8	0
Sep 1	8	4	2	2
Sep 2	4	2	2	0
Sep 3	3	3	0	0
Sep 4	2	2	0	0
Sep 5	3	2	1	0
Sep 6				
Sep 7				
Sep 8				
Sep 9				
Sep 10				
Sep 11				
Sep 12				
Sep 13				
Sep 14				
Sep 15				
Total	2,393	1,050	1,293	50

# SFSR TRAPPING 1988

## LENGTH FREQUENCY



Appendix 4. South Fork Salmon River length frequency.

Appedix 4A. Brood year 1988 adult length frequency trapped at  
South Fork Salmon River trap.

Fork Length (in)	Males	Females
18	6	
19	8	
20	7	
21	7	
22	6	
23	3	
24	4	
25	9	
26	7	1
27	23	3
28	51	23
29	72	34
30	95	90
31	92	123
32	56	98
33	48	89
34	46	160
35	80	201
36	107	256
37	105	119
38	84	36
39	69	13
40	44	2
41	40	0
42	18	0
Subtotal	1,087	1,248
Grand Total	2,335	
Additional 58 fish hauled to Stolle Meadows.		
Run Total	2,393	

88TABLES


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